Big Hole National Battlefield
Natural Resource Brief

National Park Service
U.S. Department of the Interior

Ponderosa Pine (*Pinus ponderosa*) Genetics Study

Importance: Preserving Native Gene Pools to Maintain Species Integrity

Ponderosa pine is one of the most widespread, economically and ecologically important conifer species in the Western U.S. It is even considered by some as a species that may be affected by climate change and in need of adaptive management strategies. In 2011, samples from the Big Hole Valley in Montana were collected as part of a Wyoming BLM/USFS project. Preliminary results suggest that the Big Hole population was the most inbred of any population sampled in Montana, Wyoming, and Idaho. Furthermore, the Big Hole stand is outside of the currently accepted range for ponderosa pine. Samples indicate that the ages of several of the trees may exceed 630 years. This date is significant in that the Medieval Climate Anomaly (a warm, dry period from 1050 to 650 BP [Before Present], including widespread severe multi-decadal droughts) was ending and the Little Ice Age (a cool wet period from 500 to 100 BP) was beginning. The Ice Age period would have changed the environmental conditions to favor lodgepole pine and true firs over ponderosas. The Big Hole ponderosas have shown great localized adaptability to establish during a dry period and to survive thru the Ice Age.

Objectives

- Adequately map the genetic variation of ponderosa pine throughout its range.
- Evaluate the potential for migration of different genotypes under a changing climate scenario.
- Assess conservation biology needs of unique genotypes.

Ponderosa pine trees are found along the edges of the steep hillside pastures at Big Hole National Battlefield.

2012 Status

Scientists suggest that the Big Hole area will become more climatically conducive to ponderosa pine in the future. If this is accurate, then it's important to manage the Big Hole stands to keep them on the landscape, so the locally adapted ponderosa genotype is available to fill a future niche. More samples from ponderosa pines located on Big Hole NB will be submitted to the USFS lab and analyzed this year.

Management Applications

- Inform decision making and detect resource concerns
- Conserve, identify, develop, and expand ponderosa pine populations and habitat at Big Hole NB
- Inform general recovery actions at Big Hole NB

Ponderosa pines are distinct, having slender evergreen needles in bundles of 3 and reddish-purple to yellow pollen (male) cones 2-3cm long.

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